APPENDIX B.

ETSC SITE REPORT

ETSC INTRODUCTION

The Engineering Technical Support Center (ETSC) is located in the National Risk Management Research Laboratory, Cincinnati, Ohio. ETSC is part of the Office of Research & Development of the EPA, and supports regional and headquarters personnel using its expertise in engineering and site remediation. This report represents technical assistance that was completed for the Anaconda mine site, Yerington, Nevada in April, 2001. The request for technical assistance was made by the Remedial Project Manager (RPM), Bonnie Arthur, of Region 9 Superfund. This particular report was part of an early fact-finding and site characterization survey to view possible exposure pathways to residents off-site.

OVERVIEW OF THE SITE

The Yerington Mine site (CERCLIS # NVD083917252), dba Anaconda Copper Company, is located approximately one mile west of the town of Yerington in Lyon County, Nevada. The mine was operated between 1953 and 1978 for extraction of oxide and sulfide copper ores from an open-pit in the southern portion of the site. In 1989, another company, Arimetco International expanded leaching operations in other parts of the site, and constructed an electrowining operation near the mill area. Leach pads appear in several places on the site, along with evaporation ponds, most of which have been lined for use today as part of the pumpback well system.

REPORT PREPARATION

This report was prepared by the ETSC from information supplied by the Applied Geosciences Group at Idaho National Engineering Laboratory under an Interagency Agreement (DW89938999) with the National Exposure Research Laboratory in conjunction with Technical Support Center for Monitoring and Site Characterization.

Air Pathway Contaminant Transport Potential from Mine Tailings/Waste at the Yerington Mine, Nevada - Initial Observations from the April 25, 2001 Site Visit

On April 25, Mike Abbott of the Idaho National Engineering Laboratory participated in a Yerington Mine tour with Ken Brown, Bonnie Arthur, Dave Reisman, and Ed Bates of EPA, Nevada Division of Environmental Protection (NDEP) staff, and individuals representing the Paiute Indian Reservation, which borders the mine area. Mike performed a limited Areconnaissance@ survey of surface tailings areas (both piles and dry ponds) to assess the potential for wind suspension and downwind transport of contaminated dust. Aggregate size distribution, which is one of the parameters that determines the potential for wind suspension, was measured at five sites. Other critical wind suspension parameters investigated included: 1) the presence of crusting and natural cementing of the surface aggregate, 2) the presence of non-erodible elements (basically pebbles) which protect the fine fraction from wind action, 3) the presence of moisture, and 4) the presence of mechanical disturbance (e.g., ORVs), which can produce dust emissions that far exceed those from wind action alone. References consulted for this assessment include: 1) Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites, EPA/600/8-85/002, Feb 1985 and 2) Hazardous Waste TSDF (Treatment, Storage, and Disposal Facilities) Fugitive Particulate Matter Air Emissions Guidance Document, EPA/3-89-019, May 1989.

Wind Suspension Potential. The potential for significant airborne transport of contaminated tailings areas appears to be relatively low at the present time based on the following observations:

1. All of the tailing piles examined exhibited a highly cemented surface aggregate. This characteristic was observed in areas with surface water erosion, areas which showed some relatively recent mechanical disturbance, and non-eroded areas.
2. With one exception (3, below), all of the dry tailings ponds exhibited dense surface crusting that exceeded 0.6 cm thick and was not easily crumbled between fingers. This degree of crusting typically indicates a non-erodible (by the wind) surface.
3. One tailings pond area (Ayellow ponds,@ UTM 309736 E, 4319438 N) exhibited a sandy, non-crusted surface with about 50% coverage of non-erodible elements (0.5-1- cm dia rocks). The aggregate size mode (40%) of the fine fraction was 0.38 mm, with 5% less than 0.25 mm. Wind suspension of the fine fraction is certainly possible in these areas, although relatively high wind speeds would be needed due to the high coverage of non-erodible elements. Past wind transport of the fine fraction in these ponds is indicated by the presence of sandy dune areas in narrow borders around the inside of the pond berms. This sand material was extremely uniform in size (90% 0.38 mm dia mode) and was not observed in the other tailings pond areas with non-erodible crusts. This suggests that the source of this material is the pond itself and not windblown native soils.
4. The Ared dust area,@ (UTM 308699 E, 4320935 N) which had reportedly high historical dust plume emissions had been recently capped by the NDEP. The capping material was a Aroad-base@-like tailings material which was well compacted and

cemented. The surface material is obviously non-erodible (aggregate size mode > 2 mm and very difficult to sample).

5. Although some unauthorized off-road vehicle (dirt bike) use has been observed in the past, there was no evidence of any significant activity or tracks during the tour.

Sampling. Although the potential for wind suspension of the tailings currently appears to be low, past releases from the Ared dust area@ may have been significant. One possible way to assess the historical impacts from these emissions would be attic dust sampling, as recommended by Dave Reisman. Sampling is always preferable to air dispersion modeling for reconstruction of past releases if: 1) the fallout from the source of interest in the sampling medium can be differentiated from background/baseline source contributions, 2) adequate sampling sites (both numbers and locations) in the plume impact area(s) can be found, and 3) the sample can be correlated with a specific (preferably long-term) source emissions time period. This latter requirement is needed to calculate annual intake rates (either from inhalation or ingestion) which are needed to estimate human health impacts.

Air Dispersion Modeling. Refined air dispersion modeling for a best-estimate prediction of past and future impacts is not recommended at this site because of the non-erodible surface characteristics throughout much of the area, the extreme heterogeneity and size of the source areas, and the lack of adequate, site-specific meteorological data. However, a screening model calculation could be done to estimate maximum potential (upper-bound) impacts from historical releases from the red dust area and current releases from the Ayellow pond@ areas (3, above). An upper-bound estimate can be used to determine whether human health impacts are likely below a threshold level of concern (e.g., 1×10^{-5} cancer risk, or an EPA Region 9 Preliminary Remediation Goal [PRG]) but will not provide a good estimate of actual impacts. This screening calculation (from reference 1, equations 4-4 and 2-1) requires the following input parameters: 1) annual average wind speed, an *upper-bound estimate* of which could be obtained from other Nevada meteorological stations, 2) threshold wind speed, with is obtained from an upper-bound estimate of the aggregate size mode (0.2 mm), and 3) concentrations of contaminants (mg/kg) at the surface of the modeled source (e.g., red dust). A screening air dispersion model assessment could then be performed using one of the following tools: 1) the pre- run regional ISCLT tabulations in reference (1), 2) ISC3 runs with wind files from the two closest available met stations (e.g., Reno, Tonopah), or 3) a SCREEN3 model run with an annual average persistence factor applied, which will give maximum upper-bound impacts in the worst-case direction. All of these modeling options will have a high level of uncertainty with regard to *direction* of actual impacts. However, they can be used to provide a reasonable degree of confidence on whether impacts could potentially have exceeded a health criteria.